NON-PUBLIC?: N
ACCESSION #: 8802080318
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Fermi 2 PAGE: 1 of 5

DOCKET NUMBER: 05000341

TITLE: Reactor Scram Due to Personnel Error and Subsequent Reactor Water Cleanup System Isolation
EVENT DATE: 12/31/87 LER #: 87-056-00 REPORT DATE: 01/30/88

OPERATING MODE: 1 POWER LEVEL: 075

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iii)

LICENSEE CONTACT FOR THIS LER:
NAME: Patricia Anthony, Compliance Engineer TELEPHONE #: 313-586-1617

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: BF COMPONENT: VTV MANUFACTURER: T020
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On December 31, 1987 during the installation of a temporary monitor and printer, an increasing demand signal was received by the feedwater control system due to the accidental grounding of a cable. Feedwater flow increased until high reactor vessel water level conditions occurred. A reactor scram occurred approximately 30 seconds later. In the process of plant cool down, the Reactor Water Cleanup System (RWCU) isolated due to a differential flow condition.

The personnel involved had altered a plant input to the unit without properly assessing the consequences. Appropriate levels of discipline were administered. The temporary modification procedure is being revised to add additional installation guidance.

The position indication and relays for the vent valve which contributed to the RWCU isolation was replaced. A design change which will prevent recurrence of the isolation is scheduled to be implemented during the Local Leak Rate Testing Outage this spring.

(End of Abstract)

Initial Plant Conditions:

Operational Condition: 1 (Power Operation)
Reactor Power: 74.5 %
Reactor Pressure: 960 pounds per square inch
Reactor Temperature: 550 degrees Fahrenheit

Description of the Event:

On December 31, 1987, a temporary modification for a monitor and printer was being installed. The intent of the modification was to provide operations personnel with a means to determine water level in the Number 1 Feedwater Heaters by correlating the feedwater temperature across the Number 1 Feedwater Heaters to the heaters water level. The expected temperature rise varies directly with the percent reactor power. Personnel installing the temporary modification found they were unable to use the gross megawatt signal and substituted feedwater flow.

At 1852 hours, the input signals to the data acquisition unit for feedwater flow in loop A were being connected in parallel to the inputs to the process computer (CPU) system. During this evolution, control cable 232670-OK was lifted from the process computer termination cabinet. The lead contacted the cabinet and grounded loop A feedwater flow (FE) instrument loop C32N002AS.

Grounding instrument loop C32N002AS increased the current through the feedwater square root converter C32K619A until its power supply C32K613 protection fuse (FU) cleared. Proportional amplifier C32K615 provides a summation of flow through feedwater loops A and B and is powered from the same power supply.

As a result, its output went to zero and indicated feedwater flow had decreased by fifty percent when in reality, feedwater flow was stable. The feedwater control system demand signal increased and feedwater flow responded. This rapid increase in feedwater flow caused a high reactor pressure vessel (RPV) water level. A fast closure of the turbine control valves (SCV) and a reactor scram occurred at 1852 hours because of this condition. Once the high level turbine trip setpoint was reached, fast closure of the turbine control valve occurs. At greater than twenty five percent reactor power this initiates a reactor scram.

At 1905 hours, the reactor scram signal was reset. By 1930 hours, the proper

isolations had been verified to have occurred.

On January 1, 1988 at 0832 hours, condenser vacuum was broken. The Reactor Water Cleanup (RWCU) (CE) delay volume's saturation conditions were above the reactor pressure vessel's saturation conditions. This caused the fluid in the delay volume to flash to steam. Both RWCU pumps (P) tripped due to low flow. Immediate attempts to restart the pumps were unsuccessful. Therefore, a gravity drain path to the main condenser and subsequently, radwaste was established by 0855 hours.

At 0907 hours, the RWCU blowdown control valve, G33-F033 (FCV) automatically closed due to a low pressure condition. It is postulated that this condition was created by the failure of the reactor vessel head vent valve, B21-F403 (VTV) to operate. The vent valve to the main steam line, B21-F005 (VTV) did not provide a vent path since condensing steam in the piping had formed a loop seal. With no vent path available, the low pressure condition in the RPV reduced the RWCU System pressure.

A column of water was held in place within the RWCU blowdown line after the closure of G33-F033 by the differential pressure condition. Eventually the pressure within the line equalized and the column of water was released. The flow created by the release was detected by the RWCU blowdown flow element, G33-N011 (FE) as a differential flow condition. This initiated an isolation of the RWCU System per design at 1000 hours.

On January 2, 1988 at 0700 hours, the RWCU pumps were placed back in service.

Cause of the Event:

The requirement to revise the temporary modification before proceeding was not recognized by the individuals (utility non-licensed) involved. Therefore the review of risks associated with the action was not performed. This resulted in an abnormal feedwater flow signal caused by a grounded lead being sent to the feedwater pump controller.

There were several contributing factors to the isolation of the RWCU System. First, there was a random component failure of the reactor vessel head vent valve. This eliminated the vent path; allowing a column of water to be retained in the RWCU blowdown line. Next, there are several previously identified design deficiencies within the RWCU System. The design of the delay volume allows for steam flashing during startup and shutdown of the reactor. This causes the pumps to trip. Finally, the flow element, G33-N011 is located downstream of the blowdown control valve. This location allows sensing flow due to condenser vacuum or partially filled blowdown lines.

Analysis of the Event:

The engineered safety features challenged during the scram on December 31, 1987 responded per their design. This placed the reactor in a safe condition by shutting it down. The isolation of the RWCU System was per design since a differential flow condition was sensed. This event verified the ability of the system to isolate from the RPV promptly in order to protect the vessel inventory. If this scenario had occurred under other plant conditions, the safety consequences would not have been more severe. This event did not pose any danger to the health and safety of the public or plant personnel.

Corrective Actions:

Individuals involved in this event were administered appropriate levels of discipline. The individuals were also counseled on good work practices. The importance of following procedures and getting revisions approved before continuing work on temporary modifications was stressed.

The lessons learned from this event will be reviewed to provide new and existing employees information on the importance of plant configuration control. The program will be upgraded as required. This is expected to be completed by the end of March 1988.

The need for a checklist when implementing changes to the computer system will be evaluated. This is expected to be completed at the end of April 1988.

The temporary modification procedure 12.000.025 is being revised. Currently the revision is expected to be completed in February 1988. A clarification will be added to state that if a temporary modification is changed it
ust be
revised and receive all necessary reviews.

The position indication switches and the relays for the reactor vessel head vent valve have been replaced and valve is operable. During the Local Leak Rate Testing Outage, modification will be implemented which will eliminate the RWCU delay volume piping. This outage is scheduled to begin in late February 1988.

Some recommendations for improving operating procedures for the RWCU System have been made. These will be evaluated by the middle of February 1988. As appropriate, revisions will made to the procedures.

Previous Similar Events:

This is the first time that failure to revise a temporary modification has resulted in a reactor scram. Isolations of the RWCU system due to differential flow conditions were reported in Licensee Event Reports 85-024, 85-046, 85-061, 85-063 and 85-065. An engineering evaluation was initiated due to the number of RWCU isolations experienced in 1985. The modifications to the system piping being implemented during the Local Leak Rate Testing Outage are the result of that review.

Failed Component Identification:

B21-F403: Target Rock Solenoid Valve Model No. 81M-004

ATTACHMENT # 1 TO ANO # 8802080318 PAGE: 1 of 1

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Nuclear Operations 10CFR50.73
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313-586-5300 Operations

January 30, 1988
NRC-88-0015

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Reference: Fermi 2
NRC Docket No. 50-341
Facility Operating License No. NPF-43

Subject: Licensee Event Report (LER) No. 87-056-00

Please find enclosed LER No. 87-056-00, dated January 30, 1988, for a reportable event that occurred on December 31, 1987. A copy of this LER is also being sent to the Regional Administrator, USNRC Region III.

If you have any questions, please contact Patricia Anthony at (313) 586-1617.

Sincerely,

/s/ W. S. Orser
W. S. Orser
Vice President
Nuclear Operations

Enclosure: NRC Forms 366, 366A
cc: A. B. Davis
J. R. Eckert
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Wayne County Emergency
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